

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 030036	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/EP2004/002999	International filing date (<i>day/month/year</i>) 22.03.2004	Priority date (<i>day/month/year</i>) 02.04.2003
International Patent Classification (IPC) or national classification and IPC G11B20/10, G11B27/10, G11B27/30		
Applicant THOMSON LICENSING S.A. ET AL.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 4 sheets, as follows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application 		
Date of submission of the demand 08.10.2004	Date of completion of this report 26.07.2005	
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International application No.
PCT/EP2004/002999

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3 and 23.1(b))
 - publication of the international application (under Rule 12.4)
 - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-22 as originally filed

Claims, Numbers

1-10 as originally filed

Drawings, Sheets

1-22 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages
 - the claims, Nos. 1-10
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

the entire international application,

claims Nos. 1-10

because:

the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-10 are so unclear that no meaningful opinion could be formed (specify):

see separate sheet

the claims, or said claims Nos. 1-10 are so inadequately supported by the description that no meaningful opinion could be formed.

no international search report has been established for the said claims Nos.

the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

has not been furnished

does not comply with the standard

the computer readable form

has not been furnished

does not comply with the standard

the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

See separate sheet for further details

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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Item III : non-establishment of opinion with regard to novelty, inventive step and industrial applicability together with Item VIII: observations on the clarity of the claims, description and drawings or on the question whether the claims are fully supported by the description

No examination of claims 1-10 was performed because of lack of clarity of independent claims 1 and 9, and lack of support for these claims in the description (Article 6 PCT).

1) INDEPENDENT CLAIM 1: lack of clarity, no support from the description.

1.a) In claim 1 it is written "reading, upon said requests, portions of data from two or more data streams". It is not clear from this wording whether portions of data are read when said requests are being queued by the scheduler, or when said requests are being served by the pick-up (according to the description, p.10 I.20-24, it seems that portions of data are read when the pick-up serves the requests).

1.b) In claim 1 it is written "reading, upon said requests, portions of data from two or more data streams". It is not clear whether portions of data are read
- from the stream for which the remaining amount in the corresponding buffer is below a threshold, and from the other streams as well.
- or only from the other streams.

1.c) The first data stream (S1) has a higher data rate than the other data streams (S2,S3), says claim 1. It is not clear whether this rate refers to the input data rate or the output data rate of each buffer (according to the description, p.7, I.3 and I.8; eq.2 on p.8, it seems that it is the output rate of each buffer).

1.d) The term "individual buffer bridge time" has no well-recognized meaning. It leaves the reader in doubt as to the specific time it refers to. The reader might be led to think that this buffer bridge time relates to the time needed to input into a buffer, or read from a buffer, an amount of data equal to

- the prior art bridge buffer D_b , of figure 1.a, or
- the extension buffer b_x , of figure 1.b, or
- the bridge buffer D_b + the extension buffer b_x .

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This "buffer bridge time" of claim 1 is therefore totally unclear (according to the description, p.13, l.10-13, $T_{empty,i}$ is the "buffer bridge time": the time that can be bridged by the buffer I without refilling).

1.e) In claim 1 it is written that the buffer bridge times of the buffers that relate to the other data streams (S2,S3) are integer (lambda) multiples of the buffer bridge time of the buffer that relates to the first data stream (S1) with the highest data rate.

First, see 1.d): it is not clear to the reader what this buffer bridge time specifically means.

Second, for sake of clarification, let us take the definition of bridge time $T_{empty,i}$ given in the description p.13, l.10-13. Claim 1 suggests that the proportionality factor between the buffer bridge times of S1 and of S2 is exactly equal to the integer lambda.

This is not supported by the description. Indeed $T_{empty,i}$ must be equal to or higher than the time required to access other streams, read them and store them to their respective buffers (p.13, l.10-13), but

- nowhere is it demonstrated that the proportionality factor between the buffer bridge times of S1 and of S2 has to be an integer,
- and nowhere is it mentioned that the proportionality factor between the buffer bridge times of S1 and of S2 has to be equal to the parameter lambda which is solely defined as the ratio of the pick-up jump frequencies (equation 8.1 or 8.2).

2) INDEPENDENT CLAIM 9: lack of clarity, no support from the description.

2.a) In claim 9 it is written that the first buffer having a buffer size B1 is for buffering a portion of a first data stream, and it refers to a time required for outputting the buffered portion.

It is not clear what the size of the buffered portion is: 0 ? B1 ? an arbitrary amount between 0 and B1 ? The same comment applies to the other buffered portions in the other buffers. Claim 9 lacks the essential feature of specific buffer sizes and specific buffered amounts in order to solve the problem of the invention as stated on p.3, l.2-4 (reduction of pick-up jumps).

2.b) Claim 9 suggests that the proportionality factor between the times to read buffered

portions of S1 and of S2 is exactly equal to the integer lambda. This is not supported by the description. Indeed, parameter lambda is the ratio of the pick-up jump frequencies (equation 8.2), not that of times to read out data from buffers.

3) FURTHER COMMENTS ON PROPORTIONALITY, FOR CLARIFICATION PURPOSES

3.a) The highest pickup jump frequency $f_{i,r=\max}$ related to buffer I is forced to be equal to $\lambda \cdot f_i$, where f is the individual pickup jump frequency of the other buffers j. This is obtained by individually adjusting the extension buffer sizes b_{x_k} . This reduces the overall pickup jump frequency f_{jump} (p.11, I.6-20), and solves the problem of the invention as stated on p.3, I.2-4.

The asymmetry factor lambda is solely defined as the ratio of the pick-up jump frequencies (equation 8.1 or 8.2).

3.b) There is no linear relationship between pickup jump frequencies and buffer bridge times (see eq.7.1: f_i is not proportional to $T_{\text{empti},i}$). Assuming a proportionality factor between buffer bridge times to be equal to lambda is therefore wrong.

3.c) Even though p.5, I.18-20 states that the time between read requests for S2 is a "multiple" of the time between read requests for S1, the rest of the application fails to give any explanation of how this would be obtained.

Moreover, one should not confuse the concepts of read requests and pickup jumps. A request to read part of a file can sometimes lead to a large number of jumps if the data is spread all over the medium; it can sometimes lead to a just one jump or no jump at all if the data happens to be close to the actual position of the head. Consequently there is typically no linear relationship between the amount of read requests and the amount of associated pickup jumps. Assuming a proportionality factor between average read requests per time unit to be equal to lambda is therefore wrong.

Claims

1. A method for controlling a pick-up for reading data streams from a storage medium, the data streams being distributed to more than one file on said storage medium and being separately intermediately buffered after reading, and after intermediate buffering the data streams being continuously read from the buffers and being used for simultaneous reproduction, wherein
5 said buffers have different individual output data rates and buffer sizes, and wherein the buffer with the highest output data rate relates to a first data stream (S1), the method comprising:
 - detecting individually for the separate buffers that the remaining amount of buffered data is below a threshold;
 - upon said detection, generating and scheduling a request for the pick-up to read data from the corresponding data stream for filling the buffer, wherein the request indicates the respective data stream to be read, and wherein each of said buffers generates an individual average number of requests per time interval (f) resulting from its output data rate, its size and said threshold;
 - upon the pick-up serving said request, reading data from the indicated data stream and buffering the read data in the corresponding buffer, wherein the average number of requests per time interval of the buffer that relates to said first data stream (S1) is a first number, and the average number of requests per time interval of another of said buffers relating to another (S2,S3) of said data streams is an integer (λ) multiple of said
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first number, the integer (λ) being at least two.

2. Method according to claim 1, wherein at least three data streams (S₁, S₂, S₃) are read.

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3. Method according to claim 2, wherein the integer (λ) is the same for all said other data streams (S₂, S₃).

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4. Method according to claim 3, wherein the data streams comprise at least a video stream, an audio stream and a subtitle stream, with $f_{\text{video}} = \lambda f_{\text{Audio}} = \lambda f_{\text{Subtitle}}$.

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5. Method according to any of the previous claims, wherein during initialization first said other data streams (S₂, S₃) and then said first data stream (S₁) are read from the storage medium.

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6. Method according to any of the previous claims, wherein during initialization the buffer for the first data stream (S₁) is filled completely, and the buffers for the other data streams (S₂, S₃) are filled only partially.

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7. Method according to any of the previous claims, wherein during initialization the order of reading the data streams (S₂, S₃) other than said first data stream (S₁) from the storage medium is identical, or reverse, to the order that said other data streams (S₂, S₃) have on the storage medium.

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8. Method according to any of the previous claims, wherein also data streams are read from said storage

medium that are not subsequently buffered.

9. Apparatus for reading data streams (S1,S2,S3) from a storage medium, the data streams being distributed to more than one file on said storage medium and being separately intermediately buffered after reading, and after intermediate buffering the data streams being continuously read from the buffers and being used for simultaneous reproduction, wherein said buffers have different individual output data rates and buffer sizes, and wherein the buffer with the highest output data rate relates to a first data stream (S1), the apparatus comprising:

- a pick-up for reading the data streams from said storage medium;
- means for detecting individually for the separate buffers that the remaining amount of buffered data is below a threshold;
- means for requesting the pick-up to read data from the corresponding data stream for filling the buffer, wherein the request indicates the data stream to be read, and wherein the average number of requests per time interval (f) is individual for each of said buffers, resulting from its output data rate, its size and said threshold, with the average number of requests per time interval of the buffer that relates to a first data stream (S1) being a first number, and the average number of requests per time interval of another of said buffers relating to another (S2,S3) of said data streams being an integer (λ) multiple of said first number, the integer (λ) being at least two; and

- means for scheduling said request before being served by the pick-up.

10. Apparatus according to the previous claim, wherein
5 said storage medium is an optical disc and wherein
said first data stream (S1) is a video data stream and
said other data streams (S2,S3) comprise audio data
and subtitle data.